ARJUNA

JEE

LECTURE NO. -1

Basic Maths

MSM SIR

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ARJUNA JEE 2023

CLASS SCHEDULE

08 JUNE - 12 JUNE

DAY	4:30 - 6:15 pm	6:45 - 8:30 pm
Monday	Chemistry	Mathematics
Tuesday	Chemistry	Physics
Wednesday	Chemistry	Mathematics
Thursday	Mathematics	Physics
Friday	Chemistry	Physics

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01 Wavy Curve Method

02 Questions Practice

EQUATIONS and INEQUATIONS

Two real numbers or algebraic expressions related by the symbol " =" form an equation.

ex) → $x = 2$

$x^2 + 4x + 7 = 0$

$3 = 3$

Two real numbers or algebraic expressions related by the symbol "$<, \leq, >, \geq$" form an **inequation.**

(inequality)

① $x < 2$

② $x - 2 > 5$

③ $x \geq 2.5$

④ $x^2 + 4x \leq 2$

⑤ $2 < 3$

SYMBOLS

① '$\in$' → 'belongs to'

② '$\forall$' → 'for all'

③ '∞' → Infinity (Sabse Bada number Ko Represent Karne ka Method)

④ '$-\infty$' → minus ∞

USE OF BRACKETS

[ ] → close Bracket

( ) → open Bracket

{ } → curly Bracket

$x \in [1, 2]$

$x = 2, 1$

and all the ∞ values b/w '1' and '2'

$x \in (7, 9)$

$x \neq 7, x \neq 9$

x = all the values b/w '7' and '9'

$x \in \{-2, 1\}$

$x = -2$
$x = 1$

'x' assumes only two values '-2' and '1'

$x \in [2, 3)$

$x = 2$
$x \neq 3$

'x' assumes all the ∞ values b/w '2' and '3'.

Gyaan →

① $x \in [2,4]$

OR

$2 \leq x \leq 4$

② $x \in (2,3]$

OR

$2 < x \leq 3$

③ $x \in (2,7)$

OR

$2 < x < 7$

$x \in (2, \infty]$ ✗

$x \in (2, \infty)$ ✓

$x \in (-\infty, 7)$ ✓

★ Rule →

NOTE : Infinity and –Infinity are always used with open brackets.

NUMBER LINE REPRESENTATIONS

$x \in [2, 3)$ OR $2 \leq x < 3$

Solid Dot

open Dot

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$x \in (-\infty, 7)$.

OR, $-\infty < x < 7$

$x < 7$ OR $x \in (-\infty, 7)$ OR $-\infty < x < 7$

$x \geq 8$ OR $x \in [8, \infty)$ OR $8 \leq x < \infty$

Q. Write Correct number line representation for : $(x < 8)$

OR, $x \in (-\infty, 8)$

OR, $-\infty < x < 8$

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Q. Write Correct number line representation for: $(-2 < x \leq 7)$

OR, $x \in (-2, 7]$

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'U' → union → 'Set Theory'

↳ combined Representation

$x \in (2,3)$; $x \in [4,9)$

$$x \in (2,3) \cup [4,9)$$

↳ Rule.

Q. Write Correct number line representation for: $x \in [-1, 9) \cup (10, 11]$

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Q. Correct option representing

$x \neq 4$?

(1) $x \in (3, 5] \cup [9, 11)$

(2) $x \in (3, 5] \cup [9, 11) - \{4\}$

(3) $x \in (3, 4) \cup (4, 5) \cup [3, 11)$

(4) $x \in (3, 4) \cup (4, 5] \cup (9, 11)$

$x \in (3,4) \cup (4,5] \cup [9,11)$

OR,

Kuch new

$x \in (3,5] - \{4\} \cup [9,11)$ ✓

Q → $x \in (3,7] \cup [8,9) \cup (9,50]$

can also be written as

$x \in (3,7] \cup [8,50] - \{9\}$.

State T/F. "TRUE"

Q → $x \in (3,7) \cup (8,10] \cup (10,99)$ can also be written as

$x \in (3,7) \cup (8,99) - \{10\}$.

T/F. "False"

Q → $x \in (2,3) \cup [3,7) \cup [7,8) \cup (8,9)$

write other way to write it.

Soln →

$x \in (2,7) \cup [7,9) - \{8\}$ ✓

OR

$x \in (2,9) - \{8\}$ ✓

Q → $x \in [2,7] \cup (8,10) \cup [10,11) \cup [11,13) \cup (13,18)$

Simplify

Soln → $x \in [2,7] \cup (8,13) \cup (13,18)$ ✓

OR

$x \in [2,7] \cup (8,18) - \{13\}$ ✓

Q → $x \in (10, 12) \cup (12, 13] \cup (13, 20)$.

Simplify

Soln → $x \in (10, 20) - \{12\}$ Ans.

Number line Representation →

$x \in (10, 12) \cup (12, 20)$ OR $x \in (10, 20) - \{12\}$

Note →

① $x \in R$

↳ "all Real numbers"

$x \in (-\infty, \infty)$

② $x \in \phi$ ⟶ x has No value.

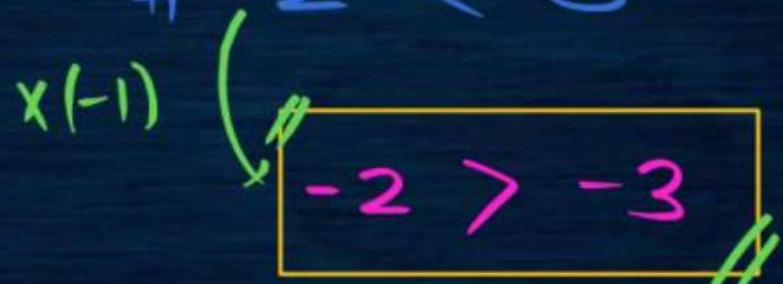
'phi'

"No solution"

COMMON OBSERVATIONS

Observation No. 1 :

If we multiply both the sides in an inequality by a negative number , the sign gets reversed.



★ Gyaan → Agar minus se multiply karaega, toh sign bhi palat jaega.

Observation No. 2 :

- "abcd"

x(-1) → (-a)(-b)(-c)(-d) = abcd (Chunnu Bhaiya) ✗

x(-1) → (-abcd)

x(-1) →

(-a)(b)(c)(d)

OR

a(-b)(c)(d)

OR

a(b)(-c)(d)

OR

a(b)(c)(-d) ✓

(Munnu Bhaiya)

★

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ex) → $N = 2 \times 6 \times 7 \times 8$

$\times(-1)$

$\times(-1)$

$(-2)(-6)(-7)(-8)$

$2(-6)(7)(8)$

Solve for $x \rightarrow$

$$(x^2 - 3x + 2) \geq 0$$

↳ It means "Find that value of x, for which $(x^2 - 3x + 2)$ is greater or equal to zero".

① T/F

(i) $2 > 0 \Rightarrow$ 'T'

(ii) $0 > 0 \Rightarrow$ 'F'

(iii) $0 \geq 0 \Rightarrow$ "TRUE"

greater than or equal to

"Valid"

(iv) $0 \leq 0 \Rightarrow$ "TRUE"

(v) $2 \geq 2 \Rightarrow$ TRUE

(vi) $2 < 2 \Rightarrow$ False

(vii) $2 = 2 \Rightarrow$ True.

The wavy-curve method will be explained again in the next turn.

WAVY CURVE METHOD

→ Used to solve "Inequalities"

Working Rule →

① make one side equal to '0'.
(Take all terms to one side).

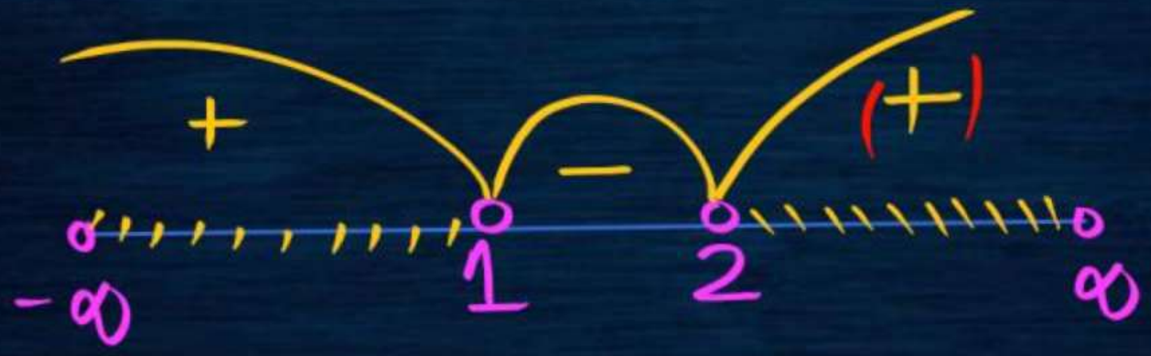
② make sure that leading Coefficient is Positive.
(Coeff. of highest degree term)

③ Factorize to linear Factors.

④ Make "number and Enjoy) line"

POLYNOMIAL INEQUALITIES

(i) $(x-1)(x-2) > 0$ Solve for x.



$x \in (-\infty, 1) \cup (2, \infty)$ Ans.

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(Homework)

DPP1 →

Q1, Q2, Q3, Q4,

Q5, Q6, Q7, Q8, Q9

Thank - You